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ABSTRACT

Examined are ways in which adaptive aids make communication available to nonverbal severely physically handicapped persons. Techniques for initial assessment are described, including evaluation of outward orientation, motor control and binary choice system. The Herald, an electronic communication board, is said to meet criteria of adaptability, reasonable cost and maintenance, and promotion of self expression and independence. Use of the Herald in the classroom is reviewed. (CL)

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Title: The Herald: An Electronic Aid to Communication for the Severely Handicapped

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This paper suggests ways in which adaptive aids make communication available to the severely handicapped person, even when verbal or manual expression are not feasible. Techniques for assessment are described, including such aspects as outward orientation, motor control, binary choice system, visual and auditory abilities, and the desire to communicate.

Criteria to be considered when selecting adaptive communication equipment include adaptability to changes in the student's requirements, ease of understanding and operation, applicability to a wide variety of teaching techniques, students and situations. The aid must be designed to encourage self-expression and independence. It must maintain a feasible balance between function, cost and maintenance.

The HERALD, an electronic communication board developed for use in the home and classroom, meets the above criteria. Techniques for teaching control of the board's remote switches and for utilization of the board in the classroom are discussed.

For more information, write to The HERALD Company, 2163 Marsh Avenue, Pittsburg, California 94565.

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THE HERALD

AN ELECTRONIC AID TO

COMMUNICATION FOR THE SEVERELY

PHYSICALLY HANDICAPPED

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THE HERALD
AN ELECTRONIC AID TO COMMUNICATION FOR THE SEVERELY PHYSICALLY HANDICAPPED

Social isolation is one of the greatest burdens of the severely physically handicapped person. The inability to communicate prevents full participation in the world around him. Adaptive communication aids can be part of the solution to this isolation. This presentation suggests ways in which adaptive aids make communication available even when verbal or manual expression are not feasible.

There are several types of adaptive communication aids available. Many of these have been developed to meet the needs of adults incapacitated by stroke or accident. The use of these aids is predicated on the assumption that the adult, prior to his accident or stroke, possessed normal cognitive and language skills. These aids are designed to offer alternative forms of writing and speech or to control life environment systems, such as lights and television.

The communication aids to be discussed here are designed for use by children in the classroom to enable them to participate in the teaching/learning process and to influence their life environment. Communication aids are usually designed to operate in one of three ways: (1) The first is direct selection, that is, pointing to the exact response desired. (2) The second requires the manipulation of two-to-three input switches in a coded fashion in order to generate a choice. (3) The third scans from one answer to the next until the preferred response is selected. This presentation is concerned with electronic equipment designed on the scanning principle, for it is felt that this method allows for greatest flexibility and control by the student.*

INITIAL ASSESSMENT OF STUDENT ABILITIES

Decisions about communication alternatives, particularly the electronic communication aids, must be made only after careful assessment of the child's present needs and capabilities. Investigation of these areas is imperative before choosing the type of communication system for the child. The techniques for assessment and training described in the paper while designed specifically for electronic communication devices, can be utilized with other communication systems such as pointer boards and signing.

OUTWARD ORIENTATION

A child must have a degree of outward or social directedness before a systematic communication approach can be developed. It may be necessary for the teacher to help the child develop this outwardly-directed orientation through some sort of "intrusive" means. Outward orientation would include any response on the part of the child that indicated an awareness of his environ, such as reacting to sound, light and movement.

MOTOR CONTROL

It is important to know the child's strengths and limitations in terms of motor control of various parts of the body. Assessment of motor control could be accomplished simply by having the child press against the teacher's hand. A switch activated by the body movement could be used to operate a buzzer board or light.

* For additional information regarding various types of aids, contact:

TRACE Research and Development Center
922 ERB, 1500 Johnson Drive
University of Wisconsin
Madison, Wisconsin 53706

The following checklist may be helpful:

1. Can he move one or more parts of his body? Is this movement voluntary or involuntary?
2. Is the movement weak or strong? Is it independent of other body movements? Is the nature of the movement spastic, athetoid or some other abnormal pattern?
3. How can the movement be described in terms of directionality, duration, ease and range?
4. Can the movement be released, as well as initiated voluntarily?
5. What cues are needed to elicit the movement? Can the child respond to a verbal cue or must he have a movement to imitate or tactile stimulation to cue him?
6. Does the control of the movement vary greatly with emotional stress, fatigue and anxiety?
7. What physical restraints might be helpful in directing and controlling the movement?

BINARY CHOICE SYSTEM

Many children enter school with a basic YES/NO system developed out of necessity. The parent should be asked to describe how the child communicates his choices. Does he smile and frown? Does he signal with eye movements? Does his body tone change to indicate needs? Is the signal system used appropriately and consistently?

Some sort of binary choice system is important to the development of an effective communication method. If the child does not yet possess such a system, the teacher has many opportunities to develop this method of expression on the part of the child. For example, at lunch time, the child can be asked to choose one of two foods, instead of being given whatever is on hand at the time.

VISUAL ABILITIES

The choice of a communication system should take into account the child's visual abilities. Some systems can be modified readily for a child who is visually handicapped but others require normal vision. Electronic communication aids have been utilized with the visual handicapped by modified teaching techniques, such as the addition of a sound cue paired with the lights.

Assessment of visual abilities can include the following questions:

1. Does the child follow visually in the direction of a person or object moving through his field of vision?
2. Can he move his eyes to follow a brightly colored object, such as a familiar toy?
3. Is the movement smooth? Do the eyes fixate on the object when it has finished moving?
4. How large an object is needed to achieve adequate tracking?
5. Does the intensity and/or color of the light affect the tracking?
6. Is there any evidence of figure-ground problems?

Some preliminary training in visual tracking may be appropriate prior to actual work in language. The teacher can use a variety of objects and situations. For example, the teacher could use a flashlight, varying the color of the light with cellophane paper over the lens, turning the light on and off. Sound cues, such as a cricket toy, could be paired with the light to aid tracking.

AUDITORY ABILITIES

Many children entering special education classes have not had an adequate assessment of their hearing sensitivity. Informal assessment of auditory abilities is an important part of an initial evaluation.

1. Does the child appear to respond to verbal instructions?
2. Does he need visual cues as an aid in responding?
3. Do auditory cues associated with movement help him to maximize his motor response?

If a child does not have adequate hearing sensitivity to respond to verbal commands of normal classroom intensity, teaching techniques can be modified to take this into account. The teacher must maximize input through other modalities, such as vision and touch. Other considerations would include sound amplification, such as an auditory trainer, elimation of competing noise, and increasing the intensity of any buzzer or similar sound cue being used.

DESIRE TO COMMUNICATE

Perhaps the most difficult area to assess is the child's desire or need to communicate, his internal drive to make his needs known and to initiate changes in his environment. Yet the strength of this drive can mean the difference between success and failure in the use of a communication device. Some children will remain passive even when given the opportunity to affect their world. Some children have never been allowed to make choices. Those living and working with them have consistently anticipated and attended to their needs, preventing the development of a need to communicate.

Assessment of the student's desire to communicate requires that the staff observe the child's behavior under various conditions over a period of time noting his reactions and the circumstances in which the behaviors occur.

ALTERNATIVE COMMUNICATION SYSTEMS

After an assessment has been completed, various systems of communication can be reviewed to determine which one best fits the current needs and capabilities of the child. No one system works for all children. It is the responsibility of the staff and parents, when choosing a system or combination of systems, to consider all the alternatives: speech or some type of vocalization, sign language, pointer boards, electronic communication aids, or some combination of these.

CRITERIA FOR SELECTING AN ELECTRONIC COMMUNICATION AID

There are several criteria which should be considered when selecting adaptive communication equipment.

1. The aid must be adaptable to changes in the student's requirements.

The equipment must be able to meet not only present needs, but also the changing abilities of students as they develop and progress. For example, the student may begin with voluntary control over only one body part. He will. therefore, need a system controlled by a single remote control switch. As the student develops facility with his communication system, he may develop greater voluntary control and be able to operate a second or third control switch. The equipment must have built-in flexibility to capitalize on the student's improving capabilities.

2. The equipment must be easy to understand and operate.

An electronic communication aid must have an operational format simple enough to be mastered by developmentally delayed students. Some systems require the student to remember and use a complicated encoding process to operate the equipment. Other systems require that the student anticipate the progress of a moving light and stop it over his answer. This is often quite difficult for students with visual-motor problems.

3. The aid must be useable with a wide variety of teaching techniques.

The system must be able to help the student learn basic skills and concepts. It also must be adaptable to increasingly complex teaching techniques and subject matter. As the student progresses, it must be adaptable to teaching complex ideas.

4. The aid must be adaptable to a variety of students and situations.

Few schools or agencies can afford to purchase equipment designed solely for an individual student. An aid should be useable by several students and designed to accommodate a wide variety of remote control switches. It must also adapt readily from one situation to another, including the classroom, home hospital and community.

5. The aid should encourage busy teachers to use it for teaching.

Even the most dedicated teacher finds it difficult to take time during class to make extensive changes in the equipment as the class progresses. The equipment must be designed to facilitate easy transition from one subject matter to another.

6. The aid must be designed to encourage self-expression and independence.

The system must enable the student to initiate and express his personal needs and feelings. The equipment should have the capability of being used to control other equipment such as typewriters and household appliances.

7. The aid must maintain feasible balance between function, cost and maintenance.

Some aids are so complicated electronically that their expense puts them beyond the financial reach of the typical school system or agency. Cost and convenience of maintaining equipment is an important factor in the decision.

THE HERALD, AN ELECTRONIC COMMUNICATION AID

The HERALD was developed in the classroom to meet the needs of severely handicapped, non-verbal children. As an alternative communication system, it has the following advantages and disadvantages:

ADVANTAGES

1. The remote control switches are useable by students with multiple handicaps, operated by minimal movements from any part of the body. The switches don't rely on the sutdent's ability to extend and sweep the arm across a lap tray.
2. The child does not need to track and stop a moving light.
3. The HERALD can be operated by one movement of any part of the body. It does not require the coordination of simultaneous movements.
4. The operational concepts of The HERALD are quite simple. The relationship between the operation of the remote control switches and the movement of the lights in the display panel is predictable and remains under the control of the student.
5. The HERALD can be utilized to control other pieces of equipment to extend its range of application, e.g., typewriter, System 80 machines, home light switches, bed position controls, cooking utensils. This adaptability extends its use to other environments, such as home, workshop and community. This adaptability increases cost effectiveness, making it more attractive to funding agencies.
6. The HERALD can be mounted directly on a wheelchair and can be battery-operated, allowing for maximum portability. Semi-portable and large classroom models are also available.
7. The HERALD is considerably less expensive than many of the more sophisticated systems currently available commercially. It maintains a balance between useable function, appearance, and cost.

DISADVANTAGES

1. When the student is beginning to use The HERALD, he is limited to the answers selected and mounted on the display panel by the instructor. However, as he develops facility with the equipment, an index system can be used to enable the student to indicate which topics he wants mounted on the display panel for discussion.

2. Since the light in the display panel in The HERALD moves only when the student makes it move, the system may, at first, appear slower than systems using a light scanning continuously until stopped by the subject. However, if the student fails to anticipate the movement of the self-scanning light and doesn't stop at his chosen answer, he must repeat his efforts. The HERALD is designed to enable the student to move the light step by step until he reaches his answer.

3. The appearance of The HERALD is utilitarian. It is packaged to perform, not merely to impress. This balance between function and appearance enables The HERALD to be produced at the lowest possible cost.

THE HERALD, A BRIEF DESCRIPTION

The HERALD is a patented visual display board operated by remote control switches. It comes in several models with numerous options available. The basic display has three rows of five lights each. The display panel is inset into a tackboard/flannelboard. One remote control switch moves the light, pulse by pulse, horizontally in each of the three rows. The second switch moves the light vertically in each of the five columns. The HERALD can be modified to sweep through all three rows with the use of just one remote control switch. The various models range from a small portable unit, to a larger classroom unit, to an expensive model that may be built by the teacher or parent. The HERALD IV is designed for flexibility, large enough for the classroom, yet small enough to be portable. It contains four to six lights and up to three audio modalities, enabling it to be used with an almost endless range of subject matter and by a classful of students with a variety of physical needs and limitations.

TEACHING BOARD CONTROL

Speech and sign language are direct forms of communication. A communication board is, by its very nature, one step removed from direct person-to-person dialogue. Consequently, students and teachers using The HERALD must learn to adjust to this difference and the skills required to operate The HERALD must be learned much like other skills.

Maximal utilization of The HERALD requires two remote control switches, the first to move the light horizontally and the second to move it vertically. It is suggested that the student master the control of the first switch before he is asked to operate a second switch. The student should consistently be able to get to a specific position or target on the display board before working on a second switch. For example, the teacher might mount a treat and ask the child to move the light to that position. It is crucial that mastery of the control and mastery of the subject matter not be confused.

Teaching control of the second switch is best accomplished by temporarily removing the first switch to avoid confusing the child. The same mastery procedures are followed.

The next step in the process is the re-introduction of the first switch. The student is again asked to find different targets. The teacher may find it helpful to explain in advance which moves the student should make to reach his target, until he has learned to plan his own moves.

If the student has been unable to master control of the second switch, it is possible to utilize the entire display panel for teaching purposes, either through teacher intervention or internal modification of the equipment.

UTILIZING THE HERALD IN THE CLASSROOM

The HERALD is designed to be used in the classroom as both a teaching aid and as a means of communicating basic needs. It operates in a variety of visual and audio modalities to encourage its use with a wide range of subject matter. Further, because the display panel functions as a tackboard, pegboard and flannelboard, it can be used with standard teaching materials or materials custom-made with minimal effort.

Instead of eliciting verbal or written responses to questions, the teacher asks the student to light up answers on the display panel of The HERALD. Upon receiving the student's feedback to his questions the teacher can evaluate the success or lack of success of the lesson and make modifications as indicated. Student-tutors can be asked to transpose answers indicated on The HERALD to written work sheets or as verbal responses in large group discussions. This is especially helpful when the handicapped student is integrated into a regular classroom.

The HERALD can be used to enable the student to signal his basic needs. The needs are identified. Each of the needs is described on separate cards which are placed under each of the lights on the display panel of The HERALD. If the student is unable to read, it may be helpful to include pictures which represent the need expressed on the cards.

It is sometimes convenient to gather associated teaching material or expressions of functional needs and place them on large translucent sheets. These sheets are used then as overlays fitting over the entire display panel. With experience the student, teacher, and family can develop a wide-ranging series of overlays indexed together in such a way that the student can indicate topics to be placed on The HERALD. This extends the range of The HERALD to eventually allow almost free discussion.

If you wish further information regarding the use of The HERALD in the classroom, home, or hospital, please send $1.00 to cover postage and handling to The HERALD Company, 2163 Marsh Avenue, Pittsburg, California 94565. If you have specific questions regarding the use of the equipment with your student, please feel free to ask for suggestions. The HERALD Company is considering the possibility of conducting a summer camp to teach students, teachers, and families how to use the equipment. Your comments on this are welcome.